HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

QUALITY ASSURANCE MANUAL

FOR

MATERIALS

OCTOBER 2001

MATERIALS TESTING AND RESEARCH BRANCH
2530 LIKELIKE HIGHWAY
HONOLULU, HAWAII 96819

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I. INTRODUCTION

The Materials Quality Assurance (MQA) Program represents the Hawaii Department of Transportation (HDOT), Highways Division's (HWY) recognition of its responsibility and commitment to ensure that materials incorporated into highway construction projects conform substantially to requirements of the plans and specifications, including approved changes. The Materials Testing and Research Branch (MTRB) Quality Assurance Manager will manage the MQA Program. The Quality Assurance Officers are responsible to implement the Materials Quality Assurance Program within their Districts and Counties. The MQA Program is composed of the following: Laboratory Qualification Program, Personnel Qualification Program, Materials Acceptance Program, and Independent Assurance Program. Refer to Appendix 1 for flow diagram showing the interrelationship of the different programs.

The following procedures and guidelines are provided to ensure the quality of materials for all State Highway construction projects, and County Federal-aid projects on the National Highway System, according to Title 23, Code of Federal Regulations, part 637, subpart B, Quality Assurance Procedure for Construction.

II. DEFINITIONS

Central Laboratory (CL). Hawaii Department of Transportation, Highways Division, Materials Testing and Research Branch (MTRB) at 2530 Likelike Highway, Honolulu, Hawaii, 96819.

Construction Materials Laboratory (CML). Contractor or Commercial Testing Laboratory qualified to perform sampling and testing.

Engineer. The Administrator of the Highways Division or the Director or Chief Engineer responsible for County roads, acting directly or through a duly authorized representative.

Laboratory Technician. Personnel qualified in one or more of the Aggregate, Asphalt, Concrete, or Soils modules, performing laboratory testing for qualified laboratory.

Materials Engineer. Materials Testing and Research Engineer of the Highways Division, 2530 Likelike Highway.

Proficiency samples. Homogeneous samples produced and distributed by the Central Laboratory for testing by two or more laboratories. Test results are compared to ensure that laboratories are obtaining results within acceptable limits.

Qualified laboratories. Laboratories meeting requirements defined in the Laboratory Qualification Program.

Qualified sampling and testing personnel. Personnel meeting requirements defined in the Personnel Qualification Program.

Quality Assurance. All planned and systematic actions necessary to provide confidence that a product or service will satisfy given requirements for quality.

Quality Assurance Manager. Materials Engineer or his designated representative to manage the Materials Quality Assurance program within the Highways Division.

Quality Assurance Officer. District or County Engineer or their designated representative responsible for administering the Materials Quality Assurance program within the District or County.

Quality Control. All Contractor/Vendor operational techniques and activities performed or conducted to fulfill contract requirements.

Random sample. Sample drawn from a lot in which each increment in the lot has an equal probability of being chosen.

Split sample. Two or more equal parts from a homogeneous sample.

Verification Sampling and Testing. Sampling and testing done by the Engineer to validate product quality when Contractor sampling and testing are used in the Materials Acceptance Program.

III. LABORATORY QUALIFICATION PROGRAM

A. Purpose. This program provides uniform, statewide procedures for ensuring that laboratory facilities and equipment are capable of performing materials sampling and testing in accordance with methods used in the Materials Quality Assurance Program. The Materials Testing and Research Branch (MTRB), accredited under the AASHTO Accreditation Program, is responsible for overseeing the statewide Laboratory Qualification Program.

B. Scope. Laboratories that perform sampling and testing and furnish test data for use in the Materials Quality Assurance Program shall be qualified. This includes but is not limited to the following:

1. Commercial laboratories;

2. Contractor laboratories;

3. County laboratories;

4. State District laboratories.

C. Qualification Procedures.

1. To qualify State District Laboratories, the MTRB will do the following:

a. Verify that current editions of references used to perform tests are available.

b. Document that laboratories have required equipment to perform tests.

c. Verify that a list or record of all laboratory equipment requiring calibration/verification is maintained.

d. Check that calibration/verification records for each piece of equipment include the following:

(1) Description of equipment;

(2) Identification of individual(s) performing work;

(3) Frequency of calibration, date of calibration, and date of last calibration;

(4) Identification of calibration or verification procedure used;

(5) Identification of any calibration/verification device or traceable standards used;

(6) Results of work performed;

(7) Procedure used to identify non-compliant equipment.

e. Verify that sampling and testing personnel are qualified according to Section IV — Personnel Qualification Program.

2. Laboratories other than State District Laboratories shall be qualified by verification of the following:

a. Laboratories shall be accredited for applicable test methods by AASHTO Accreditation Program or comparable accreditation program approved by FHWA.

b. Sampling and testing personnel shall be qualified according to Section IV — Personnel Qualification Program.

3. In addition, equipment may be subject to calibration, verification, or inspection by the MTRB.

4. Calibration standards and laboratory equipment calibration frequencies shall be as specified in the applicable test methods for which the equipment is intended to be used. Calibration/verification is required whenever a laboratory or equipment is moved. Qualification of a laboratory shall be valid for three years, after which time the laboratory shall be requalified.

5. Any equipment in a qualified laboratory failing to meet specified equipment requirements for a specific test method shall be identified as such and shall not be used for that test method.

D. Disqualification. A laboratory that does not maintain qualification requirements is subject to disqualification. Test results from disqualified laboratories shall not be used in the Materials Quality Assurance Program.

E. **Documentation Maintenance**. The MTRB will be responsible for maintaining documentation on all laboratories that it qualifies. Qualified laboratories shall be responsible for maintaining equipment calibration/verification records.

F. **Disputes**. Disputes concerning calibration and verification of equipment will be resolved by the MTRB Materials Engineer, who will have final authority.

IV. PERSONNEL QUALIFICATION PROGRAM

A. Purpose. This program provides uniform, statewide procedures for ensuring personnel are capable of performing materials sampling and testing in accordance with methods used in the Materials Quality Assurance (MQA) Program. The Materials Testing and Research Branch (MTRB) is responsible for administering the statewide Personnel Qualification Program to qualify personnel performing sampling and testing used in the MQA Program.

B. Scope.

1. All personnel (laboratory and field) performing material sampling and testing in any of the modules listed below, shall be qualified in the respective sampling and testing procedures:

	Modules	Test Methods	
a.	Aggregate	AASHTO:	T2, T11, T27, T176, and T248
b.	Asphalt	AASHTO:	T40, T166, T168, T209, T255, and T275
		WAQTC:	TM6
c.	Concrete	AASHTO:	T22, T23, T97, T119, T121, T141, T152, and T231
		ASTM:	C1064
d.	Soil	AASHTO:	T87, T89, T90, T99, T180, and T265
		HDOT:	TM5
e.	Field Sampling and Testing	AASHTO:	T2, T23, T40, T119, T141, and T168
		ASTM:	C1064
		HDOT:	TM1 and TM3

2. Sampling and testing personnel will be qualified for a maximum period of five years, based on successful completion of a written examination and a performance examination. Personnel must reapply for qualification after five years.

3. The following personnel (evaluator/examiner) may qualify an individual to perform sampling and testing on materials by administering the required written and performance examinations:

a. MTRB personnel authorized by the Materials Testing and Research Engineer.

b. State or consultant personnel authorized by the Materials Testing and Research Engineer.

4. MTRB will schedule qualification examinations (written and performance) at least two times a year. A schedule will be posted on the DOT Highways web site (http://www.state.hi.us/dot/highways).

5. To apply for the examinations, an individual shall submit completed copy of Hawaii Transportation Personnel Qualification Program Registration Form (HDOT-TPQP-1) and Transportation Personnel Qualification Program Rights and Responsibilities Agreement (HDOT-TPQP-2) to MTRB Quality Assurance Manager at 2530 Likelike Highway, Honolulu, Hawaii 96819. (See Appendix 2 for form and agreement). Program may require a registration fee.

6. Individuals qualified by Western Alliance for Quality Transportation Construction (WAQTC), American Concrete Institute (ACI) for concrete, or other independent sources acceptable to the Materials Testing and Research Engineer shall be exempted from the MTRB qualification procedure for the applicable module. However, notification in writing, of such qualification, shall be made to the Quality Assurance Manager, who will verify and approve such qualification and maintain a record of qualified individuals.

C. Qualification Procedures. To qualify, an individual shall pass a written examination and a performance examination of all the applicable test methods in that module.

1. Written examination.

a. Examination will require detailed knowledge of the test method procedures and basic reading comprehension. Examination will be a closed-book exam. Calculations may be required for some questions. Examination will be administered within a specified time frame by an evaluator authorized by the Materials Testing and Research Engineer.

b. The individual must pass with a minimum score of 70 percent for each test method in a module. Failure in more than 50 percent of the test methods in the initial exam will be considered failure of the entire examination. If the individual fails not more than 50 percent of the test methods on the initial exam, that individual will be allowed one retest on the same scheduled examination day, for each failed test method. Failure in any of the retested methods will be failure of the entire examination.

2. Performance examination.

a. The examination will be a closed-book exam. Each examination shall be completed within the time limit designated by the MTRB for that test method.

b. Performance qualification will be based on the ability to correctly perform required procedures, for each of the test methods. Omission of any one of the prescribed procedures will constitute failure of that test method. Inability to complete test method within designated time limit will constitute failure of the method.

c. Failure in more than 50 percent of the test methods in the initial exam will be considered failure of the entire examination. If the individual fails not more than 50 percent of the test methods in the initial exam, that individual will be allowed one retest on the same examination day, for each failed test method. Failure of any of the retested methods will be failure of the entire exam.

3. Any disputes, complaints, or protests regarding an examination or examiner shall be immediately submitted, in writing, to the MTRB. Written complaint shall contain the examination date, the name of examiner, and description of dispute, complaint, or protest. Written disposition of the dispute, complaint, or protest will be made by the Materials Testing and Research Engineer, whose decision will be final.

4. If an individual fails to be qualified, or if qualification is revoked or terminated, the individual may reapply to take the next scheduled examination by submitting a new registration form and paying any required registration/examination fee.

5. Notification of each individual's successful or unsuccessful completion of the qualification requirements will be mailed by the MTRB.

6. Qualified personnel are subject to the requirements of the Independent Assurance Program.

D. Documentation. The MTRB will be responsible for maintaining documentation of all individuals qualified under its authority who perform required sampling and testing for acceptance of materials. Quality Assurance Officer shall also maintain a list of qualified individuals performing sampling and testing on projects under their supervision. Documentation retention will be for the life of the qualification.

E. Suspension and Revocation of Qualification.

1. The Materials Testing and Research Engineer may revoke qualification issued by the MTRB at any time for just cause. A notice of revocation will be sent to the individual, in writing, along with the individual's right to appeal revocation. Revocation is effective on receipt of notice by the individual. Reasons for qualification revocation or suspension are negligence or abuse of responsibilities. A Qualification Revocation Committee appointed by the Materials Testing and Research Engineer will review all appeals and recommend its findings to the Materials Testing and Research Engineer. The decision of the Material Testing and Research Engineer will be final.

2. Negligence is defined as unintentional deviation from approved procedures, which may or may not cause erroneous results. Penalties for negligence are the following:

a. First offense of negligence will result in a letter of reprimand being sent to both the employee and the employer.

b. Second offense will result in a 30-day suspension of qualification.

c. Third offense will result in a 180-day suspension of qualification.

d. Fourth offense will result in permanent revocation of qualification.

3. Abuse is defined as intentional deviation from approved procedures. First offense for a finding of abuse will result in a penalty ranging from a one-year suspension to permanent revocation of an individual's qualification. Any subsequent finding of abuse will result in permanent ineligibility for any future type of (MTRB) qualification.

4. Revocations or suspensions for abuse or negligence, in one module, will be considered revocation or suspension in all modules held by the individual.

5. If warranted, the Materials Testing and Research Engineer may deviate from the above penalties.

F. **Rights and Responsibilities**. Qualification carries inherent rights and responsibilities. These rights include being exclusively sanctioned to perform sampling, testing, and reporting of test results for the Material Quality Assurance Program. These responsibilities include performing and reporting tests, with accuracy and precision expected of the qualified individual, according to required test procedures. The qualified individual shall also be aware that both State and Federal laws may govern construction projects, including Title 18, United States Code, Section 1020, that in brief, states that anyone making falsifications on Federal-aid projects "shall be fined not more than $10,000 or imprisoned not more than five years, or both."

V. MATERIALS ACCEPTANCE PROGRAM

A. Purpose. This program provides uniform, statewide procedures for sampling, testing, and inspection to ensure that the quality of materials incorporated into the project is in conformance with the plans and specifications.

B. Scope. The program applies to all State Department of Transportation Highway projects, and County Federal-aid projects on the National Highway System. All testing laboratories and sampling and testing personnel under this program shall be qualified according to the Laboratory and Personnel Qualification Programs and subject to the requirements of the IA Program. In order to avoid an appearance of a conflict of interest, any qualified laboratory, other than CL, shall perform only one of the following types of testing on the same project: Contractor sampling and testing, Verification sampling and testing, Dispute Resolution sampling and testing, or IA sampling and testing. The Sampling and Testing Guide for Acceptance and Verification (Appendix 3) identifies the material, lot size, frequency, and location in the construction or production operation at which sampling is done, and the specific attributes tested that reflect the quality of the finished product.

C. Acceptance Sampling and Testing. The State's Materials Acceptance Program will be managed by the Quality Assurance Manager. District and County Quality Assurance Officers shall be responsible for implementing the Materials Acceptance Program within their Districts and Counties. The Quality Assurance Officer shall be responsible for ensuring that only sampling and testing by qualified personnel and laboratories are used in the Materials Acceptance Program. Materials acceptance sampling and testing within a project may be accomplished by either one or both of the following methods:

1. Acceptance Sampling and Testing by District or County personnel or their designated agents.

a. Oahu District (HWY-O) Quality Assurance Officer shall be responsible for acceptance sampling and testing requirements. All sampling and field testing will be performed by HWY-O or by a designated agent. Field samples obtained for laboratory testing shall be sent to Materials Testing and Research Branch (MTRB) or to a qualified laboratory.

b. Designated Quality Assurance Officers for Hawaii, Kauai, and Maui Districts, and all Counties shall be responsible for

acceptance sampling and testing requirements within their respective jurisdictions. When laboratory testing cannot be performed by the District or County, samples may be sent to MTRB or to a qualified laboratory for required testing.

c. Samples shall be selected by the random selection method according to ASTM D 3665, Random Sampling of Construction Materials.

d. Location and frequency at which acceptance sampling and testing are to be accomplished shall conform to the Sampling and Testing Guide for Acceptance and Verification (Appendix 3).

e. Samples, test data, and certificates of compliance shall be submitted to MTRB with the white sample card (Form MTRB JC-1 or JC-1a — Appendix 2). MTRB will review all project data to ensure that materials incorporated in the construction work conform to approved plans and specifications.

2. Acceptance Sampling and Testing by Contractor with Verification by District or County, or their designated agents. This method is permitted when specified in the contract specification.

a. Contractor Sampling and Testing.

(1) Project specifications shall specify minimum quantity of tests required for Contractor Sampling and Testing. Except as otherwise specified, minimum sampling and testing shall be in accordance with the requirements shown on the Sampling and Testing Guide for Acceptance and Verification (Appendix 3). Sampling location shall be as indicated on the Sampling and Testing Guide for Acceptance and Verification.

(2) Project specifications shall require the Contractor to designate a Quality Control (CQC) Manager, who shall be responsible for managing, controlling, and documenting all activities to ensure material compliance with the contract plans and specifications.

(3) Project specifications shall require the Contractor to prepare and submit a Quality Control Plan for projects over $1,000,000.

(4) Samples shall be selected by the random sampling method according to ASTM D 3665, Random Sampling of Construction Materials.

(5) The Project Engineer shall transmit the Contractor's test results with the yellow sample card (Form MTRB CJC-2 or CJC-2a — Appendix 2) to MTRB through the District Quality Assurance Officer.

b. Verification Sampling and Testing.

(1) To validate product quality, Verification Sampling and Testing shall be performed by qualified sampling and testing personnel employed by the State or County or its designated agent, excluding qualified sampling and testing personnel employed by the Contractor. When Contractor and State or County test results differ by more than the allowable standards established by MTRB, dispute resolution procedures shall be followed.

(2) Frequency of Verification Sampling and Testing shall be a minimum of 10 percent of the Contractor Sampling and Testing requirements. Frequency may be increased by the State or the County based on a history of dissimilar test results between Contractor and Verification testing.

(3) Verification samples shall be random samples (ASTM D 3665) taken at the same general location of the Contractor's sample.

(4) Verification samples or test data shall be transmitted with the blue sample card (Form MTRB VJC-3 or VJC-3a — Appendix 2) to MTRB through the District Quality Assurance Officer.

c. Dispute Resolution Procedures. Conflicts between the Engineer and the Contractor, resulting from discrepancies in testing or non-test-related material quality disputes, shall be resolved by using the steps outlined below. Non-test-related disputes may include such items as segregation, workmanship, flushing, open joints, non-uniform mats, and other issues. If mutually agreed to by the disputed parties, other forms of resolution may be used. Any deviations from the following procedures shall be agreed to in writing.

(1) Case I: Test Related Disputes:

(a) Step I: Project Investigation.

Personnel responsible for the Contractor Sampling and Testing and Verification Sampling and Testing shall review sampling procedures, testing procedures, testing equipment, and computations. The intent of this investigation is to ensure that proper procedures are followed, equipment used is properly calibrated and functioning, and computational errors are ruled out. If problems are found, corrective action shall be taken.

If Step I does not resolve conflict, procedures in Step II shall be followed.

(b) Step II: Third Party Investigation.

Third party shall be the MTRB or a non-Highways Division laboratory designated by the Engineer. The MTRB shall be viewed as an "unbiased" third party, although technically not totally independent. The designated non-Highways Division laboratory shall be accredited in the applicable test by the AASHTO Accreditation Program or a comparable laboratory accreditation program approved by Federal Highway Administration (FHWA), with testing personnel qualified under the Personnel Qualification Program. The non-Highways Division laboratory third party shall not, in any way, be involved in the Contractor Sampling and Testing, Verification Sampling and Testing, or IA Sampling and Testing on the disputed project.

Designated third party shall examine the following:

(i) Past similar/dissimilar comparisons for the disputed item to identify any particular trends.

(ii) Results of the project-level investigation.

(iii) Results of the Independent Assurance Program.

A sample shall be split among the Contractor, Engineer, and third party to compare test results. Third party may perform additional verification testing, at the project-level investigation, as necessary.

Results obtained from split samples or new samples and verification testing shall be evaluated to decide whether initial test results obtained by the Contractor or the Engineer more accurately represent the particular material property. Third party shall submit a written report describing dispute, all subsequent actions, and final recommendation.

If this investigation shows that the Engineer's tests are correct, the Contractor shall pay for the cost of the third party investigation. Similarly, if the investigation shows that the Contractor's tests are correct, the Engineer will pay the cost of the third party investigation.

(2) Case II: Non-Test Related Disputes:

(a) Step I: Project Investigation.

The Contractor and the Engineer will jointly quantify the dispute (e.g., the area of segregation, etc.), its severity, and impact on facility performance. When testing is required to assist in dispute resolution, all parties shall agree to the sampling and testing plan, testing agency, and disposition of these findings before starting.

If Step I does not resolve dispute to the satisfaction of all parties within a previously agreed time, procedures in Step II shall be followed.

(b) Step II: Third Party Investigation.

Resolution shall be arbitrated by an unbiased third party designated by the Engineer. Third party shall submit a written report describing dispute, all subsequent required actions, and final recommendation.

When disputes are resolved by an unbiased third party, the Engineer and the Contractor shall share cost of third party investigation. Conclusions and recommendations made by any unbiased third party shall be binding.

D. Submittals. Acceptance, Contractor, and Verification Test data, and any Dispute Resolution reports shall be submitted to MTRB. MTRB will review all project test data to ensure that materials incorporated in construction work conform to approved plans and specifications. Based on this information, MTRB will issue a materials certification to FHWA for each construction project that is subject to FHWA construction oversight activities (see Section VII).

VI. INDEPENDENT ASSURANCE PROGRAM

A. Purpose. This program provides uniform, statewide procedures to ensure personnel qualified under the Personnel Qualification Program remain capable of performing sampling and testing correctly, and to ensure equipment is checked and calibrated.

B. Scope. The program applies to all State Department of Transportation Highway projects and County Federal-aid projects on the National Highway System. This program evaluates samplers, testers, and testing equipment in the modules listed in the Personnel Qualification Program. Central Laboratory (CL) personnel and test equipment are exempt from the Independent Assurance (IA) Program.

C. Responsibility. The CL will administer the IA Program. Within the Highways Division, the District Engineer or designated representative shall be the Quality Assurance Officer, who shall be responsible for coordinating the IA activities with the CL and administering these activities within the District and County.

1. The District Quality Assurance Officer shall be responsible for maintaining competency of qualified personnel, calibrating and verifying field laboratory testing equipment, and resolving any deficiencies noted by the IA evaluations. The District Quality Assurance Officer shall also be responsible for consultants, Construction Materials Laboratories (CMLs), and other agencies performing sampling and testing for the District highway projects and County Federal-aid projects on the National Highway System. The District Quality Assurance Officer may require the County to provide a Quality Assurance Officer. However, all coordination with the CL, including County projects, shall be done through the District Quality Assurance Officer.

2. CL personnel or CL's designated agents that act as IA inspectors, coordinators, evaluators, and reference testers will herein be referred to as "IA inspector". CL equipment or designated agents' equipment will be used as IA reference equipment when split sampling or split-sample testing is performed.

D. Frequency of Evaluation.

1. Qualified laboratory technicians from the State District laboratories will be evaluated annually on four modules (Aggregate, Asphalt, Concrete, and Soil) in the Personnel Qualification Program.

Laboratory testing equipment will be evaluated not less than once every three years.

2. Laboratory technicians working for CMLs, who are qualified under each of the Asphalt, Concrete, Soil, and Aggregate modules, and CML testing equipment shall be evaluated by an approved accreditation agency at a frequency established by that agency. However, MTRB Engineer may, at his discretion, conduct unscheduled site visits or require split-sample testing.

3. Personnel qualified in the Field Sampling and Testing module of the Personnel Qualification Program will be evaluated annually. The actual number of personnel to be evaluated annually will be determined by the MTRB Engineer at the beginning of each calendar year, but will not be less than 10 percent of the qualified personnel. Field testing equipment will be evaluated not less than once every three years.

4. Individuals qualified by independent sources acceptable under the Personnel Qualification Program, such as the WAQTC and ACI, who are not evaluated by an accreditation agency approved under the Laboratory Qualification Program, will be included in the pool of personnel qualified in the Field Sampling and Testing module and evaluated for the test methods used for material acceptance.

E. Method of Evaluation.

1. Sampling Personnel. Sampling personnel will be evaluated by observation.

2. Testing Personnel. Testing personnel will be evaluated by one or more of the following:

a. Observation.

b. Split-sample testing by personnel and IA inspector.

3. Testing equipment. Testing equipment covered under AASHTO R-18 will be evaluated by using one or more of the following:

a. Review of calibration and verification records;

b. Split-sample testing using equipment being evaluated and IA reference equipment;

F. Evaluation Procedures. The IA evaluation will focus on sampling and testing procedures routinely performed by the personnel to be evaluated. For example, the IA inspector may evaluate personnel who perform sampling and testing only at project sites, only on the test method section that covers sampling and testing at project sites. Materials used in IA evaluations are not required to be project specific. IA test results shall not be used to verify specification compliance on construction projects. Therefore, IA tests shall not be used for acceptance. Evaluation procedures are described as follows:

1. Evaluation by Observation.

a. Personnel evaluation of qualified laboratory technicians from the State District laboratories will be coordinated by the MTRB.

b. Observation of personnel qualified in the Field Sampling and Testing module will be performed at an appropriate location, determined by the IA inspector upon discussion with the Quality Assurance Officer or Project Engineer. The IA inspector will consider availability of materials, location of personnel, and impact to construction testing when determining the appropriate site. Sites may include a test site prepared by the District for the purpose of this evaluation.

c. The IA inspector, using a checklist, will observe the person performing the sampling or testing procedure and will note any deficiencies during the demonstration. After the demonstration is completed, the IA inspector will discuss with the person those deficiencies observed during the demonstration.

d. The IA inspector will summarize results of the IA evaluation and report any deficiencies to the Quality Assurance Officer. When deficiencies are reported, the Quality Assurance Officer shall follow procedures of Subsection VI.G — Procedures When Deficiencies Are Reported.

2. Evaluation by Split Sample.

a. Split samples may be used to evaluate personnel and testing equipment.

b. A material sample will be split into two equal portions, with one portion to be used by the tester and the other portion to be used by the IA inspector.

c. IA samples shall be placed in a container or sample bag, which shall be sealed to prevent tampering. Samples shall be submitted with a green sample card (Form MTRB IA-1 — Appendix 2). Each IA container and sample bag shall be labeled and identified as an "IA" sample. The identification shall also include a tag with the following information:

(1) IA sample number and source of the sample;

(2) Date of split sample;

(3) Address where each split sample was sent;

(4) Name of the tester.

d. The tester shall perform required test and submit test results to the IA inspector within two working days. Test data shall be submitted with a green sample card (Form MTRB IA-1 — Appendix 2).

e. The tester's results will be compared to the results of the IA inspector. Difference will be subject to the standards established by the CL. The IA inspector will summarize results of the IA evaluation and report any deficiencies to the Quality Assurance Officer. When deficiencies are reported, the Quality Assurance Officer shall follow the procedures of Subsection VI.G — Procedures When Deficiencies Are Reported.

3. Evaluation by Calibration and Verification.

a. Calibration and Verification checks shall be made to ensure equipment covered in AASHTO R-18 is within the specified tolerances. Each piece of equipment shall be checked at the specified frequency and clearly marked with an identification number.

b. The Quality Assurance Officer shall have a program to ensure equipment verification and calibration are done at the required frequency. Records of test equipment verification and calibration shall be kept on file.

c. The IA inspector will review equipment records and may, at his discretion, inspect any equipment for conformance.

d. The IA inspector will summarize results of the IA evaluation and report any deficiencies to the Quality Assurance Officer. When deficiencies are reported, the Quality Assurance Officer shall follow the procedures of Subsection VI.G — Procedures When Deficiencies Are Reported.

G. Procedures When Deficiencies Are Reported. The Quality Assurance Officer shall use one of the following procedures, as appropriate:

1. Procedures to Follow When Deficiencies Are Reported for Evaluation by Observation.

a. Discuss each procedural deficiency with the tester and review the proper procedure.

b. Observe the technician perform the test properly.

c. Prepare memorandum of record summarizing corrective action taken.

d. Submit memorandum of record to the CL.

2. Procedures to Follow When Deficiencies Are Reported for Poor Results from Split Samples.

a. Determine if the data reported were correctly entered.

b. Determine if the test results obtained were properly transferred to the submitted data sheet.

c. Determine if all calculations leading to the test results obtained were correct.

d. Determine if equipment conformed to specifications.

e. Determine if proper test procedures were followed.

f. Take corrective action to repair or replace defective equipment, or review proper procedures with the tester.

g. Prepare memorandum of record summarizing investigation results, identifying cause of deficiencies, and describing any corrective action taken.

h. Submit memorandum of record to the CL.

3. Procedures to Follow When Deficiencies Are Reported on Equipment.

a. Determine if equipment conformed to specifications.

b. If the equipment is found to be defective, take corrective action to repair or replace it.

c. Prepare memorandum of record summarizing the results of the investigation and any corrective action taken.

d. Submit memorandum of record to the CL.

VII. LETTER OF MATERIALS CERTIFICATION

A. Purpose. A letter of materials certification is issued to attest that materials incorporated in the project conform substantially to requirements of the approved plans and specifications, including approved changes.

B. Scope. A letter of materials certification will be submitted to the Federal Highways Administrator for each project subject to FHWA construction oversight activities.

C. Procedure.

1. Project Engineer.

a. The Project Engineer shall review all project records, such as sampling and testing reports, material certificates, and certified test results, to ensure that materials incorporated into the project were in conformance with the approved plans and specifications. Records for material items listed in the Project Proposal Schedule shall have been substantially documented and submitted to the MTRB during the project construction.

b. The Project Engineer shall request a letter of materials certification using Form MTRB MC — Appendix 2, Materials Certification Documentation. All applicable sections of this form shall be properly completed. Materials tracking summaries utilized by the project may be submitted to expedite procedure for the letter of materials certification.

2. Materials Testing and Research Branch.

a. The MTRB will review the project documents on file at the MTRB. When deficiencies are noted, the project engineer will be contacted for a resolution.

b. The MTRB Engineer will prepare and submit a letter of materials certification to the FHWA upon a satisfactory review.

APPENDIX 1

FLOW DIAGRAM

APPENDIX 2
FORMS

APPENDIX 3

Sampling and Testing Guide for Acceptance and Verification